DOCUMENT RESUME

ED 104 485 JC 750 273

AUTHOR Alvir, Howard P.
TITLE The Usability of Learning Materials Developed by Community College Professors.
PUB DATE 75
NOTE 49p.

EDRS PRICE MF-$0.76 HC-$1.95 PLUS POSTAGE
DESCRIPTORS *Individualized Instruction; *Junior Colleges; *Performance Based Education; Student Evaluation; *Teacher Developed Materials; Teacher Role

ABSTRACT

Although teacher-developed materials are usually created with objectives designed for a particular group of students at a particular point in time, they may be valuable for use by other instructors, at other institutions, in other circumstances. Materials which are immediately transferable to other situations should be called "usable." Materials which do not fit all of these criteria, but which are capable of adaptation to other circumstances should be called "useful." A teacher-developed resource that is ready for convenient use is packaged in such a way as to specify student-centered objectives, student-benefit evaluation criteria, and student-paced resources. Material can be defined as "usable" or "useful" on the basis of teacher evaluation, computer evaluation, or a pre-test/post-test method. Once the quality of a resource is identified, it should be compared with other resources and rankings should be made. (Author/DC)

ED104485

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

TITLE

THE USABILITY OF LEARNING MATERIALS DEVELOPED BY COMMUNITY COLLEGE PROFESSORS

AUTHOR

Howard P. Alvir, Ph.D.

DATE

April 25, 1975

Howard P. Alvir, Ph.D.
Associate in Research
Bureau of Occupational Education Research
Room 468 EBA
NYSED
Albany, NY 12234

JC 750 273

TABLE OF CONTENTS

Page

I WROTE IT, I'M A SCHOLAR, IT'S GOTTA BE GOOD----------1

EVALUATION AS KEEPING SCORE WITH A MAXIMUM OF PRODUCTS AND A MINIMUM OF PAPERWORK----------6

CONCLUSIONS----------10

CRITICAL EVALUATION FOR EVALUATION AS KEEPING SCORE WITH A MAXIMUM OF PRODUCTS AND A MINIMUM OF PAPERWORK----------12

COMPUTERIZABLE DIMENSIONS OF USE-ABILITY (USABILITY)----------13

INTRODUCTION----------14

SCALABLE DIMENSIONS OF USABILITY----------16

SCALABLE DIMENSIONS OF USABILITY (DATA, SKILLS,THINGS, PEOPLE)----18

WORDS, WORDS, WORDS REPLACED BY SIGNS, SYMBOLS, MEDIA----------19

FLOWCHART----------20

FORGET ABOUT READABILITY -- CONCENTRATE ON USABILITY----------23

FORGET ABOUT READABILITY----------24

CONCENTRATE ON USABILITY----------25

CONCLUSIONS----------27

THE TRANSITION FROM "USEFUL" TO "USABLE" A FEW LOW COST WAYS TO REVITALIZE TEACHER DEVELOPED MATERIALS----------29

INTRODUCTION----------30

A FEW LOW COST WAYS TO REVITALIZE TEACHER DEVELOPED MATERIAL------32

VOCABULARY REVIEW----------34

A SIMPLIFIED ANALYSIS OF "UNUSABLE"----------37

TABLE OF CONTENTS
(Con't)

Pages

GAINS SCORE AS A WIN-LOSS CONTINUUM----------40

A SIMPLIFIED ANALYSIS OF "SUCCESS"----------42

A SIMPLIFIED ANALYSIS OF "GAINS SCORE"----------44

A SIMPLIFIED ANALYSIS OF "PRETEST SCORE" AND "POSTTEST SCORE"-----47

CRITICAL EVALUATION FOR THE TRANSITION FROM "USEFUL" TO "USABLE" A FEW LOW COST WAYS TO REVITALIZE TEACHER DEVELOPED MATERIALS----------49

I WROTE IT,
I'M A SCHOLAR,
IT'S GOTTA BE GOOD

In the sense of publishing a book, the typical college professor is not an author.

In the sense of producing thousands of words that are reproduced and distributed to students, the vast majority of college professors are authors.

What's the difference between a published author and a mimeographed author?

I don't know, but I've got a few ideas. Most of these ideas can be summed up in the one word use-ability, commonly spelled "usability."

It is not unusual to find college professors who write out every word they teach. The percentage is approximately 5% according to a recent sampling. This means that, if there are 20 professors on your campus, at least one of them has written out almost every word to be taught.

A vast majority of professors have an outline of what is to be taught. Sometimes, the outline is in the form of content, and at other times it is in the form of course objectives.

A recent sampling indicates that approximately 65% of college professors do this. This means that 13 professors out of 20 write what is to be taught although they do not write out every word.

The other 30%, that is, the other 7 professors, are the type that extemporize.

If this professor is not very good, the students say that the professor simply doesn't prepare lessons. If the professor is scintillating and able to carry on a talk show type of course, the students say, "The guy is fantastic!!!"

If you are looking for an approbation of either writing everything out or of never writing anything out, don't read any farther. This report has an entirely different objective.

In a word, the idea behind this report is usability.

Now that we've said it for the second time, you can conclude that "usability" is an important idea.

Usability refers to the ability of teacher-prepared materials to facilitate and increase student achievement.

Let's not get hung up on definitions. Let's go to a few examples.

If a carefully penned lecture delivered by you never gets published but does result in student enthusiasm (affective gains), student applications (psychomotor gains), or in increased insight (cognitive gains), then your writing is usable.

In the same way, a carefully outlined lecture that stresses either subject matter or objectives is deemed usable if students acquire an increase in DATA POWER (knowledge objectives), PEOPLE POWER (attitude objectives), or THING POWER (performance or skill objectives).

Similarly, if an extemporized class, devoid of any written preparation, is able to ignite learner curiosity (conceptualizations, generalizations, and information), learner involvement (study habits, on the job applications, and appropriate behavior) or learner valuables (attitudes, emotions, and commitment), then this material is usable.

The question naturally occurs, "What do you call material that answers the above questions negatively?"

The polite answer is "Useful."

In other words, usable teacher-prepared materials are ready for immediate, convenient, and feasible use today, by many teachers, in many schools, with many students, and for objectives relevant to many students and teachers even when these objectives are slightly different from the objectives of the original writer.

Materials that don't fit all the criteria of usable are called useful because most of these materials are capable of being put to use someday, by someone, somewhere, with some students, and for some objective that are almost identical with those of the author.

The individual reader may not be as charitable in assigning the word useful as indicated above. However, as this author has said in the title, "A scholar wrote it, it's gotta be good." As far as good in concerned, this is defined as being at least minimally useful.

Useful is the low end of the scale on which usable is at least half way to "publishable" in a variety of media.

TITLE:

EVALUATION AS KEEPING SCORE WITH A MAXIMUM OF PRODUCTS AND A MINIMUM OF PAPERWORK

AUTHOR:

Howard P. Alvir, Ph.D.

DATE:

March 31, 1975

EVALUATION AS KEEPING SCORE WITH A MAXIMUM OF PRODUCTS AND A MINIMUM OF PAPERWORK

I've been using objectives all my life, BUT I never have written them out and I won't start now.

My job is teaching. I don't want to waste time doing a lot of unnecessary paperwork.

I've gone to workshops on independent study and individualized self-instructional packages. There must be an easier way to do this. After all, I'm a teacher, not an author.

If I kept track of everything that students do right and do wrong, I wouldn't have any time left to teach, to show them what to do, and to encourage them.

Do the above comments sound familiar?

They should. After all, these were a few of the reactions made by full time teachers after looking at the January 1975 issue of INDUSTRIAL EDUCATION.

Most of the comments were caused by rapidly glancing at two articles. The first one was by Dean Teal and entitled "Individualized Instruction Packages Made Easy," and subtitled "How to Make Up Self-Instructional Materials for Cooperative Education Students."

The second article was by Ray D. Ryan and Wayne Berry and entitled, "Motivating Your Students With Independent Study."

Nobody agrees with everything another person has to say. After all, that's the dignity of human opinion.

On the other hand, it became obvious that the preceding comments were due to a hasty reading more than to a disagreement.

If you don't recall the article, it might be enough to remind you that Teal's article gave forms and examples of how to put together a self-instructional package. This self-instructional package is structured by the teacher and consists basically of objectives, pretesting, learning activities, and posttesting. Objectives pointed out what the learner was expected to do. Pretesting helped the learner preassess previous related accomplishments and experiences. The learning activities provided a variety of things to do in order to learn the objectives. The posttesting consisted of a number of criteria that could be used by both teacher and student to evaluate success.

Teal's package is described as being structured because it was designed by the teacher and contained four above components of a module.

On the other hand, the package developed by Ryan and Berry can be described as being unstructured. In this package, the student lists a certain number of independent study objectives. Alongside the objectives, the student lists a description of each learning activity in five or six words. Alongside the learning activity is a check date. Alongside the check date is space for the teacher to decide whether or not the activity has been satisfactorily or unsatisfactorily. The paperwork is kept to a minimum by equating OK with satisfactory and X with unsatisfactory. If a job is done unsatisfactory, the student doesn't go any farther until the X is replaced with an OK.

The format of Ryan and Berry is called unstructured because the student and not the teacher decides the details of what is to be done within the framework of the teacher's generalized guidance. Similarly, the student has a share in setting up check dates. The teacher's evaluation takes on the role of an impartial umpire. In addition, there is no complicated mathematical counting to decide how well the product is done. The student keeps on trying until the job is done well, no matter how much time it takes.

Thus, on pages 26 to 30 of the January issue of INDUSTRIAL EDUCATION the teacher is exposed to at least two different formats of a student-paced learning module.

Fortunately for the teacher, both formats of modularized or independent study are easy to imitate. After all, the authors were good teachers and gave plenty of examples.

The question arises, "How usable is this material?"

Any educator worth his salt is familiar with the situation wherein material designed by one excellent teacher is found completely unsuitable for use by another equally excellent teacher.

Self-instructional materials that work with one student, in one school, with one teacher, and on one grade level don't always work when any one of the preceding elements is even slightly different.

If the above commonplaces are true, then it seems that each teacher must develop self-instructional materials all by himself. It might even mean that each student must have a specially devised piece of learner-paced material.

Stop right there.

If that much individualization is to prevail, the cost become prohibited in terms of teacher time, money, effort, interest, and good sense.

Something is wrong when a teacher is told that everything to be taught must be written out in every detail before it can be taught.

Something is wrong when a teacher concludes that something developed elsewhere for a slightly different objective, for a slightly different type of student, and in a slightly different atmosphere is absolutely unacceptable locally.

There must be a simple way to determine usability.

Usability means that a teacher can borrow other materials from colleagues without having to worry about whether or not this material will work when given to a student ready to learn on his own.

In the case of the structured module, there is a simple way to do this.

Give the student some kind of an evaluation BEFORE placing the student in contact with the individualized self-instructional package.

Give the student a test AFTER contact with the same material.

If the test given before hand is too high, either the test is too easy or the material is too easy.

If the test given before hand is low and the test given afterward is high, the teacher can make a prudent judgment that this material is USABLE.

When this happens, it's like getting bingo!

Both the teacher and the learner win.

In the case of the unstructured material, this pretesting and posttesting pattern simply doesn't work.

There is a much simplier way to keep score here.

Look at the product. When the product gets to the final acceptance stage, note the date of final acceptance.

Thus, if the product was started on January 31st and finished on February 25th, the teacher must decide whether or not this was a reasonable length of time considering the worth of the finished product.

After a while, a teacher will be able to estimate how long it takes for a student to make a table, a lamp stand, design a bathroom or execute some equally worthwhile products.

CONCLUSIONS

Anybody who rereads this article will find that there are no forms to fill in.

The paperwork has been kept to such a minimum that most teachers can do it in their head.

Whether it's done on paper or in the head of a teacher, these simple measures of usability give a teacher a track record against which to judge future projects given to learners in independent study.

If the usability of a product is low, this means the teacher must intervene and teach.

If the usability of a product is high, this means the teacher can give it to the student and allow the learner to proceed on his own steam.

During this time of independent study, the teacher avoids merely sitting back. The teacher is acting as a human being who gets to know students and individualized requirements.

This kind of humanistic activity in a school where people are important is much better than unnecessary paperwork.

TITLE

COMPUTERIZABLE DIMENSIONS OF USE-ABILITY (USABILITY)

AUTHOR

Howard P. Alvir, Ph.D.

DATE

April 7, 1975

INTRODUCTION

Computers are now being used among other things as:

A) Typewriters
B) Printing Presses
C) Test Scorers
D) Report Cards
E) Envelope Addressers

USE-ability suggests that, at the same budgeted cost PLUS a few hours of local planning and a few minutes of programming time, computers can be used to:

A - Identify usable teacher-developed materials
B - Compare psychomotor and affective measures on a Likert scale
C - Separate hi-gain independent study materials from low-gain materials by teacher-prepared pretests and posttests
D - Subdivide hi-gain independent study materials into various learning styles based upon learner types

The computer programming is left to each center. The "suggestion" to think it over, weigh the pro's and con's, and DECIDE is the main point behind USE-ability.

The value behind USE-ability is the fact that it's countable and computerizable for knowledge, performance, and attitude gains.

If you like the idea, you don't even need a computer. All you need is a pile of 3 x 5 cards and enough organization to do things systematically.

This short article on usability answers the question, "Can the materials prepared by an individual teacher be used by other teachers, with a wide range of students, on objectives slightly different from those enunciated by the original teacher?"

If the answer is yes, this teacher has usable materials.

If the answer is no, this article tells what the teacher can do about it.

The solutions proposed in this article are low cost.

This means that one principle is utilized to distinguish between two technological solutions that are equally effective.

Choose the least expensive alternative.

Sometimes, when the cost is equal, this boils down to: CHOOSE THE SIMPLEST ALTERNATIVE.

Again, all of this advice can be summarized in a short principle: AVOID COMPLICATED SOLUTIONS THAT CONFUSE TEACHERS AND STUDENTS ALIKE.

The solutions herein proposed have been tested on the community college level in courses of general education, liberal education, occupational education, vocational education, career education, humanities education, and pre-university studies.

SCALABLE DIMENSIONS OF USABILITY

Scalable means capable of being scaled.

To scale usability means to gradate, measure, estimate, pattern, make, or arrange in a sequential series.

Sometimes the scale will go from high to low. At other times, the scale will go from low to high.

Since usability is something that cannot be weighed on a scale, neither in pounds or ounces nor in kilograms or grams, it is necessary to think of scaling of usability as ranking.

Ranking means to determine the relative position of the usability of one product, process, or activity in relation to others.

When several products are ranked for usability, some will be found more usable than others. Products that are found to be almost unusable will be said to have low usability.

Products that are usable under a limited variety of circumstances will be said to have moderate usability.

Products that are found to be usable in a wide variety of circumstances will have high usability.

With such printed materials as texts, modules to be read, books, periodicals, typed materials, and the printed text of cathode ray tube presentations, usability is equivalent to readability.

Readability is concerned with data, knowledge, and the cognitive domain.

For such things as projects, external activities, performances, procedures, hands-on activities, usability is equated with DOability.

DOability refers to skills, things, performances, and the psychomotor domain.

For such things as role playing, modeling, simulation, value analysis, interactional analysis, professional standards, ethics, and attitudes are concerned, usability is equated with valuability.

Valuability is concerned with people, attitudes, and the affective domain.

Each of these three domains, cognitive, psychomotor, and affective can be further subdivided.

The table on the following page entitled SCALABLE DIMENSIONS OF USABILITY, gives several of these subdimensions under the:

Cognitive Domain (data)
Psychomotor Domain (skills, things)
Affective Domain (people)

Each of these interrelated terms will be described.

SCALABLE DIMENSIONS OF USABILITY

DATA		SKILLS, THINGS		PEOPLE	
READABLE		DOABLE		VALUABLE	
Viewable	(Lo)	Demonstrable	(Lo)	Imitable	(Lo)
Gestaltable	(Hi)	Repeatable	(Hi)	Modelable	(Hi)
Hearable	(Lo)	Startable	(Lo)	Disillusionable	(Lo)
Listenable	(Hi)	Imitable	(Hi)	Creative	(Hi)
Memorizable	(Lo)	Visible	(Lo)	Unfatiguable	(Lo)
Unforgettable	(Hi)	Observable	(Hi)	Innovative	(Hi)
Visualizable	(Hi)	Performable	(Lo)	Witnessable	(Lo)
Theorizable	(Lo)	Job-Able	(Hi)	Martyrable	(Hi)
Theorizable	(Hi)			Gamable	(Lo)
Visualizable	(Lo)			Simulatable	(Hi)
Explainable	(Lo)				
Showable	(Hi)				
Showable	(Lo)				
Explainable	(Hi)				

WORDS, WORDS, WORDS

REPLACED BY

SIGNS, SYMBOLS, MEDIA

It is undeniable that words have mattered to human beings for many centuries. After all, how else to explain the popularity of the printed page.

For just as long, if not for longer, signs, symbols, and media has mattered just as much.

If a researcher goes through notebooks, lists, collections, and diaries, a number of significant human artifacts will turn up.

Words do play an important part in recorded human history.

On the other hand, much can be learned from the following:

Pictures of intangible ideas
Photographs
Collages
Advertisements
People
Signs
Symbols
Media

It is not unusual nowadays to hear people talk about giving COLLEGE CREDIT FOR A WELL WORN LIBRARY CARD.

This means that a good reader has got the equivalent of many components of a college education.

Now would be a good time to give college credit for STRAINED EYESIGHT AND SCRATCHING ONE'S HEAD trying to figure out what is meant by various human signs and symbols, all of which can be scaled.

Flowchart

Steps

1. Number each learning packet with a local code

   LP - 06 - 04 - 01

   E.g., Field = 06 = Technology
   Subfield = 04 = Data Processing
   Package = 01 = Learning Package Tool

   (Field - Subfield - Package)

2. Number each test, parallel test, and alternate test

   TLP - 06 - 04 - 01 - A

   TLP - 06 - 04 - 01 - B

   TLP - 06 - 04 - 01 - C

3. Enter learner data by

   - learner type: (to be determined locally):

     TLP - 06 - 04 - 01 - B - 04

     and

   - learner score: (preferably a Likert scale):

     TLP - 06 - 04 - 01 - B - 04 - 15

     on both

   - pretest (B = Before):

     BTLP - 06 - 04 - 01 - B - 04 - 15

     and

   - posttest (A = After):

     ATLP - 06 - 04 - 01 - B - 04 - 85

4. Program computer:
   Compute "Gains Score = A-B"

   ATLP - 06 - 04 - 01 - B - 04 - 85
   BTLP - 06 - 04 - 01 - B - 04 - 15
   GAIN SCORE = 70

5. Program computer:
   Tabulate "Frequency count of gain scores"

   by "TLP - NN - NN - NN - A - NN" (Student type)

   by "TLP - NN - NN - NN - A" (Learning package)

6. Develop a ranked order of expectancy tables on a continuous basis

7. Once basic scoring data is in, go on to include SCALABLE DIMENSIONS OF USABILITY to correlate Learning Packages with learning styles

TITLE

FORGET ABOUT READABILITY --

CONCENTRATE ON USABILITY

AUTHOR

Howard P. Alvir, Ph.D.

DATE

March 20, 1975

FORGET ABOUT READABILITY --

CONCENTRATE ON USABILITY

It is safe to assume that most teachers don't do things that are useless. Thus, almost everything done or produced by a teacher is useful in the sense that it is capable of being put to use someday, by someone, somewhere, with some students, and for some objectives.

No matter how useful this material might be, a difficulty emerges when another teacher tries to use it. This often leads to the difference between useful as defined above and usable. All material found useful by its author is not necessarily usable by someone else.

In order to be usable, material must be ready for immediate, convenient, and feasible use today, by many teachers, in many schools, with many students, and for objectives relevant to a range of students and teachers.

In addition to tracing out some of the practical implications that arise once an educator distinguishes between useful and usable materials, this article goes on to specify a few low cost ways to revitalize teacher developed materials.

FORGET ABOUT READABILITY

The typical classroom teacher finds it easy to count sentence length. It's so easy that it becomes boring.

The typical classroom teacher finds it tedious to measure word difficulty. It's so tedious that the practice is often abandon.

Since most readability formulas rely upon sentence length and word difficulty indices, these formulas are not going to be tried very much or very often.

There seems to be a growing concensus both in the literature and in the classroom that readability formulas are for the birds with lots of extra time -- and for the experts.

The preceding sentence is meant in no way to malign the scholarly and scientific nature of readability formulas for certain specified purposes and for certain specified professional audiences.

The comment was made in a flippant manner to call attention to the fact that the typical classroom teacher wants something else.

The classroom teacher wants to provide materials that relate to subject matter, correlate with necessary skills, and foster an enthusiasm for learning on the part of the student.

In practice, this means that the teacher must chose materials that are neither too boring nor too challenging. Since it is difficult to find one book or one resource that is exactly right for the range of experience, skills, and interests found in the typical classroom, most teachers provide a variety of materials.

Certain materials, both commercial and teacher developed, are meant to be used on their own.

For example, a teacher gives a student a book, a learning package, a module, a self-instructional unit, or a learner-paced set of programmed instruction. The learner is expected to take the material and learn from it.

The typical double check in this instance is to make sure that the readability level is appropriate to the student. This can involve a lot of time with little payoff. If the readability level doesn't offer a challenge, the learner may simply lose interest not because of difficulty, but because of boredom. If the material is written in such a fashion that it is incomprehensible to the student, the learner will achieve nothing not because of lack of interest but because of unreadability.

We have already mentioned that readability is difficult to measure. Now is the time to switch over to usability.

This is no time for a scholarly dissertation. Here are a few simple ideas on how to establish usability.

Read the material yourself. If it's no good, if it's dull, if it's too difficult, if it doesn't make sense, then throw it away.

If it makes sense to you, try to come up with an objective instrument with which to measure success in students exposed to the material.

Keep the examination short. As a rule of thumb, develop one objective question for each 5 minutes of typical student exposure. If the student is expected to spend an hour and a half with the package, then develop a 15 to 20 question examination.

After the examination is developed, give it to typical learners before giving them the material.

Note the score of the students before being exposed to the material.

Note the score of the students after being exposed to the material.

The difference between the before and after scores is an index of usability.

You are the person who is going to establish the norms of usability.

Here are a few norms with which to begin:

1. If most of the students answer more than half of the questions successfully before exposure to the material, your questions need revision. Make the questions more difficult.

2. If most of the students answer less than one-fourth of the questions before exposure to the material and most of the students answer only half of the questions after exposure to the material, most likely the usability is low. Make the questions easier.

3. If the typical before test is low and the typical after test is high, you can be fairly certain you have usable material.

4. Be selective in developing your usability formula. Perhaps, you will find out that certain materials are more usable with male students than with female students. On the other hand, you may learn that other measures such as attendance, grades, standardized exams, class conduct, and concentration power are related to usability.

Don't try to be a scientific researcher instead of a teacher.

After all, usability is for you to use, not to theorize about.

How are you going to use the usability index?

The answer is up to you. If you can find material that is considered high in usability, you are able to take this material and give it to a learner who will then proceed to become an aggressive learner able to achieve success independently.

Wouldn't you like to be able to tell which of the materials you have bought, developed, stolen, borrowed, or discovered are usable.

The usability index is one way to answer this question.

CONCLUSION

Readers of the above article tend to equate usability with readability. This is correct for printed materials such as texts, modules to be read, and the printed text of cathode ray tube presentations. When tape recordings or audio cassettes are used, usability can be equated with listenability. When video tape is used, usability can be equated with viewability. When projects are used, usability can be equated with doability. When role playing and modeling are used, usability can be equated with imitability.

In each of these variations, the same proceduresto measure the difference between the before test (pretest) and the after (posttest) are to be employed.

TITLE THE TRANSITION FROM "USEFUL" TO "USABLE"

A FEW LOW COST WAYS TO REVITALIZE TEACHER DEVELOPED MATERIALS

AUTHOR

Howard P. Alvir, Ph.D.

Howard P. Alvir is an Associate in Research in the Bureau of Occupational Education Research, New York State Education Department, Room 468 EBA, Albany, N.Y. 122..4.

INTRODUCTION

It is difficult enough to establish educational policy when the individuals concerned disagree on the basic facts. But, it is sometimes even more difficult to establish policy priorities when the individuals agree on the factsunder study but disagree on how to interpret these facts.

Here are 3 facts upon which most educators agree:

> FACT ONE:
>
> The preparation of teacher-developed materials consumes a large amount of time, personnel, budget, resources, and space.
>
> FACT TWO:
>
> The author or authors of teacher-developed materials usually find these homemade remedies to be exactly what is required for a local situation.
>
> FACT THREE:
>
> Educators, other than the authors, often react to the very same teacher-prepared materials by exclaiming, "What a waste of time! These materials won't work in our school!"

Too much stress on fact one leads to the conclusion, "It's cheaper to buy commercially prepared materials."

Too much stress on fact two leads to the conclusion, "Textbooks and commercially prepared materials are both inappropriate and too expensive."

Too much stress on fact three leads to the conclusion, "If the teacher wants to get the job done right, the teacher must do everything personally and forget about expecting any help from others."

The author of this article accepts the above three facts, but rejects the above three interpretations.

This article is neither a rejection nor a condemnation. In a positive attitude, the author distinguishes

> between useful and usable teacher-prepared materials,
> between diagnostic pretesting and mastery posttesting,
> between achievement and aptitude,
> between information gained and previous information, and
> between readability and unusability.

Each of the above distinctions is followed up with practical examples in terms of things teachers can do to turn useful but impractical teacher-prepared materials into usable and convenient teacher-prepared materials.

After demonstrating that the typical teacher can make teacher-prepared materials more usable by making them more readable, the author shows a very simple procedure that any teacher who has ever corrected a multiple choice test can use to improve the readability of personally developed learning materials.

The author feels that any teacher who has put in four or five hours on a weekend preparing teacher-prepared materials is ready and willing to spend an extra half an hour to make these self-same materials more beneficial to learners. This article shows how to make the extra follow through necessary to improve documented learner benefits.

A FEW LOW COST WAYS TO REVITALIZE TEACHER DEVELOPED MATERIALS

It is disappointing to walk into a school and to discover large amounts of teacher-developed materials lying around without being used. Somehow or other, these useful materials developed with many hours of teacher effort and enthusiasm are found to be unusable.

Whenever a teacher developed resource is left on a library shelf, in a dust covered file cabinet, under a pile of papers on a teacher's desk, or in a bulging envelope, effort has been wasted. The obvious solution would be to come up with some inexpensive technique to make these materials more usable.

The dictionary tells us that the term USEFUL means capable of being put to use. The term USABLE means convenient and practical for use.

Saying that a teacher developed resource is practical is the same thing as saying that this teacher resource is feasible. Going into the word feasible implies that the teacher using a usable teacher resource can reasonably expect success.

Obviously, the vast majority of teacher developed resources are useful in the sense that someone, somehow, someday will find a particular resource to be exactly what is needed for a highly specific problem.

On the other hand, most useful teacher developed resources don't receive much usage because these resources are not usable.

A usable resource is both CONVENIENT and FEASIBLE. A convenient teacher developed resource is something that can be used immediately, with minimum modification, and with a wide variety of learners. A feasible resource is one that offers a great likelihood of success to both teacher and learner.

After this brief introduction, it might be good to pause and look at the following page entitled VOCABULARY REVIEW. Each of the terms discussed above is presented with a summary definition. It is hoped that this summary definition clarifies the distinction between USEFUL and USABLE.

There is a lot to be said for this distinction between useful and usable. This distinction has been able to help increase the efficiency of teacher-developed materials.

This increase in efficiency has been done by stressing immediate use, convenient use, and feasible use.

A teacher developed resource that is ready for immediate use is ready to go upon arrival. There is little need for elaborate set-up time. A busy teacher is able to work this resource into a busy classroom period an individualized learning lab period or an activity filled day.

A teacher developed resource that is ready for convenient use is packaged in such a way as to specify learner-centered objectives, learner-benefit evaluation criteria, and learner-paced resources. This is how convenience is kept from degenerating into laziness. An example of laziness would be a teacher who shows a film rather than prepare a lesson and the necessary discussion. An example of convenience would be the situation wherein a teacher finds exactly the right learning package for both the learner in need of remediation and for the learner in need of enrichment.

(A)

VOCABULARY REVIEW

WORD	DEFINITION
USEFUL	"Capable" of being put to use ___ someday ___ by someone ___ somewhere ___ with some students ___ for some objectives
USABLE	"Ready" for immediate, convenient, and feasible use ___ today ___ by many teachers ___ in many schools ___ with many students ___ for objectives relevant to many students and teachers
IMMEDIATE USE	The resource is ready for use upon "opening" or "arrival."
CONVENIENT USE	The resource is packaged in such a way as to specify: ___ learner-centered objectives ___ learner-benefit evaluation criteria ___ learner-paced resources
FEASIBLE USE	Success is very likely.

A teacher developed resource is ready for feasible use when success is very likely. The likelihood of success is based more upon reactions of other teachers, experiences from other schools, and recommendations from the professional literature. Too many teachers have been burned by salesmen and advertising claims to base feasibility upon unreliable sources. Few teachers will be impressed by an unknown salesman who says upon arrival, "I've got just what you need."

The theme of the above introduction can be summarized in the question posed by administrators to researchers, "What can you researchers do to transform useful teacher developed resources into usable learning packages?"

The way this question is posed, most researchers spend a large amount of time arranging available teacher developed resources into five categories:

CATEGORY ONE:

The most usable resources.

CATEGORY TWO:

Above average usable resources.

CATEGORY THREE:

Average usable resources.

CATEGORY FOUR:

Below average usable resources.

CATEGORY FIVE:

Unusable resources.

There is a certain advantage in using the above five categories. After all, teachers are interested in finding resources that fall into category one (most usable) and category two (above average usable).

After all this research is done, the fact remains that many resources declared to be of average usableness or below are not completely devoid of value. After all, it has been asserted that most teacher developed resources are useful. Useful means capable of being put to use someday, by someone, somewhere, with some students, and for some objectives.

The reason for reiterating this definition of useful is to provide a basis for at least two common causes of unusability.

Some teacher-developed materials and unusable because these same materials are UNREADABLE. Other teacher-developed materials are unusable because of a WIDE VARIETY OF OTHER REASONS. Some of these other reasons might include irrelevant objectives, vague evaluation criteria, impractical resources, outdated technology, unpopular approaches, unacceptable philosophical foundations, and unrealistic expectations.

The following page entitled A SIMPLIFIED ANALYSIS OF "UNUSABLE" provides a comparison based upon an iceberg. An iceberg presents approximately 10% of its bulk above the water line. This means that 90% of an iceberg is below the water line. (B)

To be quite frank, the present state of unusability research is not able to say whether materials found unusable because unreadable outweigh materials found unusable because of other reasons.

(B)

A SIMPLIFIED ANALYSIS OF "UNUSABLE"

Obviously unusable

Above the water line

Unusable because unreadable

Above the water line

Unusable because of other reasons:

___ irrelevant objectives

___ vague evaluation criteria

___ impractical resources

___ outdated technology

___ unpopular approach

___ unacceptable philosophy

___ unrealistic expectations

Unusable because of hidden defec

Below the water line

Below the water line

Even if research could conclusively claim that only 10% of unusable teacher-developed materials are unreadable, this would still be a good place to begin because readibility is a problem that can be readily attacked.

After the above analysis, a new research situation and question emerges.

The former research question was posed to educational researchers by school administrators who said, "What can you researchers do to transform useful teacher developed resources into usable learning packages?"

The new research question can be posed to educational researchers by classroom teachers who say, "What can you show us to make our teacher-developed resources more READABLE."

At the present time, research is being designed to answer this question.

Before the results are in, many educators are interested in the type of experimental design being developed.

The following paragraphs are intended to give a foretaste of what to expect.

At the present time, it is possible for learners to talk in terms of a GAINS SCORE. A gains score is strictly speaking what is learned between the firs day of testing and the last day of testing. The first day of testing is called the pretest. The last day of testing is called the posttest.

This leads us to the RULE OF THE GAINS SCORE: subtract the pretest from the posttest and the result is the gains score.

All of this can be visualized graphically.

Look at the following page entitled GAINS SCORE AS A WIN-LOSS CONTINUUM. Three different situations are presented:

The learner wins
The learner loses time
The learner loses interest (C)

In the situation wherein the learner wins, the box representing the pretest is smaller than the box representing the posttest. In other words, at the end of the course, the students score, final examination grade, amount of things learned, or achievement is larger than at the beginning of the course.

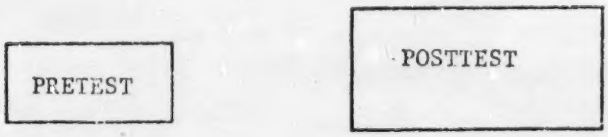
In the situation wherein the learner loses time, the learner's measurable success **before** the course is just about the same as the learner's success after the course. Unfortunately, the learner has lost time in this situation.

In the situation wherein the learner loses interest, the pretest is larger than the posttest. This doesn't mean that the learner has always lost knowledge or skills possessed at the beginning of the course. However, this situation often indicates that the learner has lost interest. In many cases, the lower posttest is explained by the fact that the learner simply did not care enough to put down all he or she knew on the final evaluation instrument.

(c)

GAINS SCORE AS A WIN-LOSS CONTINUUM

LEARNER WINS
(Posttest is bigger than Pretest)



LEARNER LOSES TIME
(Posttest is same size as Pretest)

LEARNER LOSES INTEREST
(Pretest is larger than Posttest)

So far, a distinction has been made between USEFUL and USABLE.

Another distinction has been made between PRETEST and POSTTEST.

The next distinction to be made will be between ACHIEVEMENT and OTHER CAUSES OF SUCCESS IN PRETESTING AND POSTTESTING.

The next page entitled A SIMPLIFIED ANALYSIS OF "SUCCESS" distinguishes between success caused by ACHIEVEMENT and success caused by OTHER FACTORS. Other factors could include such things as aptitude, IQ, previous achievement, heredity, environment, family, schooling, socio-economic factors, and other parameters. (D)

In this simplified analysis of success, it is possible to picture the achievement factor resembling the part of the iceberg above the water while the other factors resemble the part of the iceberg below the surface.

The success caused by achievement refers to those measures of mastery such as data, information, people, attitudes, things, and skills acquired as a result of educational effort.

In using the standard pretest and posttest situation, the gains score is the result of subtracting the pretest from the posttest.

In other words, the pretest situation resembles the part of the iceberg below the surface of the water. It is presumed that the success achieved and measured in the pretest is not lost during the training or educational process.

With this assumption, the extra amount that appears in the posttest is presumed to be success caused by achievement. In other words, if the posttest is higher than the pretest, it is assumed that certain educational influences are responsible for this increase of success.

(D)

A SIMPLIFIED ANALYSIS OF "SUCCESS"

Above the surface

Success caused by:

ACHIEVEMENT
(GAINS SCORE)

Above the surface

Below the surface

Success caused by OTHER FACTORS such as:

___ Aptitude

___ IQ

___ Previous achievement

___ Herdity

___ Environment

___ Family

___ Schooling

___ Socio-economic factor

___ Other parameters

A. Below the surface

B. Baseline data measured in pretest

Any teacher looking at this example will begin to realize that the gains score itself is composed of at least two different factors.

The gains score is composed of success caused by ACHIEVEMENT and success caused by KNOWING WHAT KIND OF POSTTEST TO EXPECT. For shorthand notation, these two factors are abbreviated ACH and TEST.

There is nothing the matter with the success due to test familarity. After all, this is one way of telling the learner exactly what is expected WITHOUT revealing the exact questions that will make up the sample of evaluation items called the FINAL EXAM.

This particular point is called to mind in order to prepare the reader for a statistical refinement that will be introduced in a later section. This is summarized on the following page, A SIMPLIFIED ANALYSIS OF "GAINS SCORE."

After having distinguished between useful and usable, between pretest and posttest, and between achievement and other factors, it is now time to distinguish between READABILITY and PREVIOUS INFORMATION.

With this distinction in mind, it will be possible to introduce the concept of INFORMATION GAINED.

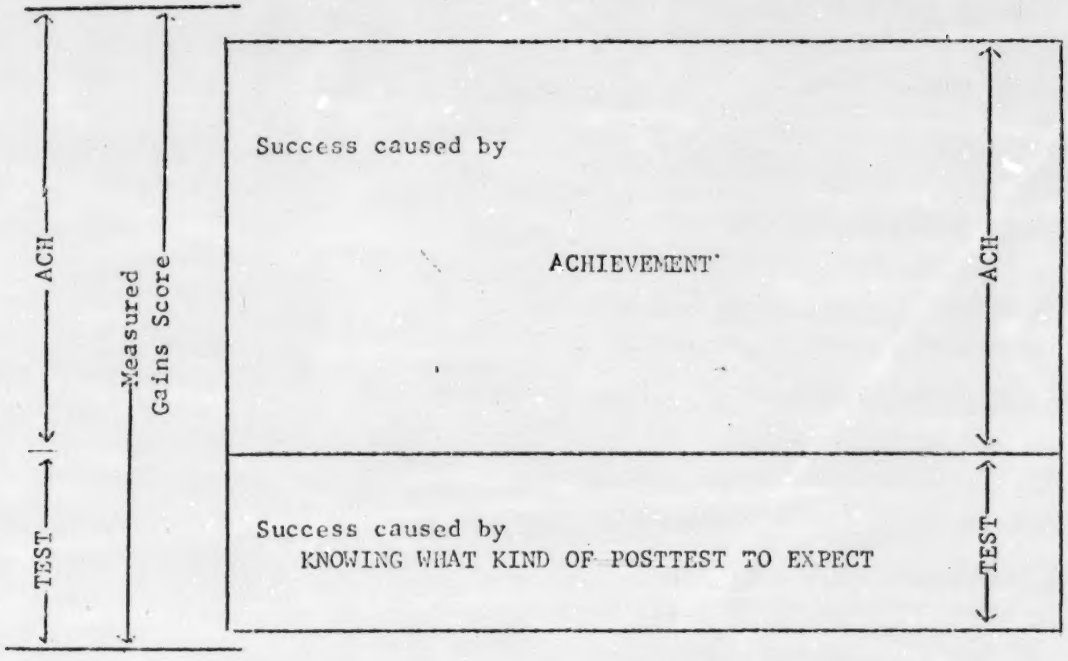
Let's apply this to a typical classroom situation.

The teacher has developed some instructional materials about which the reading level is unknown. Let's call the instructional materials text R.

The teacher has developed a 10 question multiple choice question designed to measure how well the students understand the information, data, and knowledge contained in text R.

(E)

A SIMPLIFIED ANALYSIS OF "GAINS SCORE"



The 10 question multiple choice examination is given to a group of students on Monday. These students have never had any previous exposure to text R reading material.

Even though this test is on "new" material, it is presumed that the pretest score will be measuring previous knowledge and guessing ability of the group.

On Tuesday (the next day), the same group receives the same 10 multiple choice questions. The only difference is that on the rest of Monday and on the first part of Tuesday, the group had unlimited access to the text R reading materials.

Since no group instruction was provided in addition to the reading materials, it is presumed that the posttest score measures two things: first, the previous knowledge and guessing ability of the group and second, the information gained made by the group as a direct result of reading text R.

The necessary control here is to make sure that only reading is permitted with text R reading material. This would prohibit instruction, group interaction, a chance for peer discussion, and the chance to compare notes on the questions.

Because of these empirical limitations, some teachers might find it more convenient to have the pretest at 10:00 a.m. and the posttest at 2:00 p.m. Of course, other factors such as lunch, fatigue, and looking up the answers might enter into this picture.

All of these intervening contaminating variables can be controlled by statistical design.

The preceding analysis is summed up on the following page entitled, A SIMPLIFIED ANALYSIS OF "PRETEST SCORE"AND "POSTTEST SCORE"

(F)

In order to make this practical, let's take a few examples.

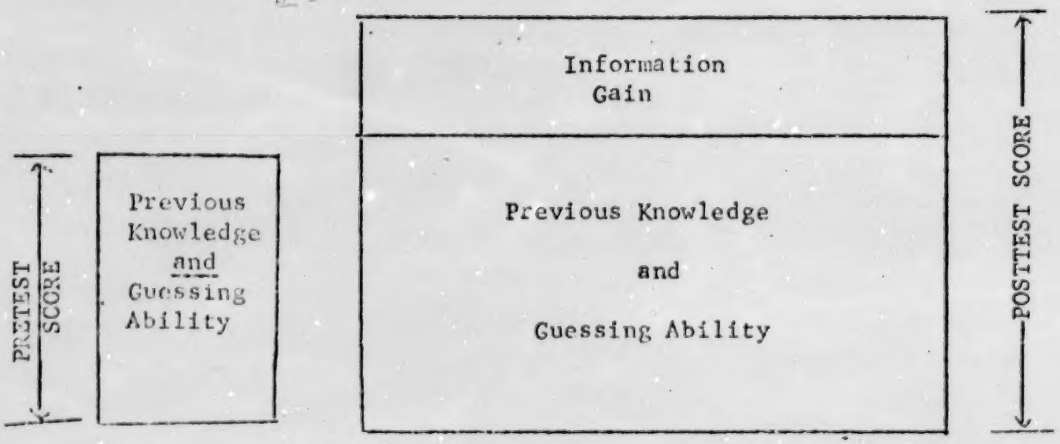
In the first example, the average class score on the pretest is 70%. The average class score on the posttest is 90%. This gives an information gain of 20%. Twenty percent might seem like a good information gain, but the point is that the high pretest indicated that most of the class knew most of the questions before any exposure to the material. This might indicate that the questions are too easy or indeed that the material is too easy.

In the second example, the group pretest average was 20%. The group posttest average was 90%. In this second case, the information gain is 70%. This seems to indicate a high level of readability on the part of the students. Of course, care must be taken that contamination does not come from inadvertent instruction, group discussion, looking up the answers, or memorizing the answers.

In example three, the group pretest average is 30%. The group posttest average is 60%. This gives an information gain of 30%. In itself, 30% doesn't mean very much. This percentage gain must be compared with similar material

(F)

A SIMPLIFIED ANALYSIS OF "PRETEST SCORE" AND "POSTTEST SCORE"



SUMMARY

If the pretest is given at 10 am on Monday without any previous exposure to Text R reading material

and

If the posttest is given at 10 am on Tuesday (the next day) and after exposure to the Text R reading material

Then the Information Gain can be said to be in proportion to the READABILITY of Text R

In other words, after the teacher has given a pretest-posttest analysis to a number of different reading materials, it is possible to scale the readability levels of various reading materials by comparing the information gained.

Such a preliminary measure of readability will enable the teacher to pinpoint difficult reading material. Once the reading difficulty has been corrected, the teacher is able to increase the usability of teacher-prepared materials.

In summary, the teacher has made teacher-prepared materials more USABLE by making these materials more READABLE.

This concludes the scope of the present discussion. As is obvious from the above, further discussion can be devoted to such topics as experimental control, computerization of the pretesting and posttesting, and the typical errors that need to be corrected in order to make a text more readable.

It is felt that making teachers aware of the simple process of making teacher-prepared materials more usable by making them more readable is the major concern of this discussion.

UNIVERSITY OF CALIF.
LOS ANGELES

MAY 16 1975

CLEARINGHOUSE FOR
JUNIOR COLLEGE
INFORMATION